RISE ASSIST APPARATUS

[0001] This application is a continuation of co-pending application serial no. 09/923,295, filed August 6, 2001, now U.S. Patent No. 6,560,794, which claims the benefit of provisional application serial no. 60/222,838, filed on August 4, 2000. applications serial nos. 09/923,295 and 60/222,838 are hereby incorporated by reference.

Technical Field

[0002] This invention relates generally to a support device, which can be attached to a bed frame or wall to permit self-assisted movement from a supine and/or seated or like position, such as movement into and out of a bed or chair. More particularly, the invention relates to a support device, which capitalizes on the kinesiology of movement into and out of a seated or lowered position, to a standing position.

Background of the Invention

[0003] A significant portion of the population has difficulty transferring himself or herself into and out of a seated or lowered position to a standing position, such as from a bed or chair. Such difficulties can be attributed to muscular trauma or illness, recuperation from debilitating disease, or age-related degeneration of muscles and body movement. One factor that is currently assessed when evaluating an individual's health care status, is the ability to rise independently from a bed. Consequently, a device to provide unassisted use of a bed, chair, toilet, or the like, could increase a disabled or elderly person's quality of life and provide them with a higher degree of independence as well.

[0004] Recent studies have shown that older patients are more likely to rotate and laterally flex their trunks to alter pivot-related motions when rising from supine to seated positions. Additionally, large numbers of such patients are more likely than comparably studied younger groups, to broaden their support base by contacting their elbow to the horizontal surface during middle trunk elevation when rising from a supine

to a sitting position. Similarly, older adults are more likely to utilize their hands or a flexed leg to assist in pulling themselves into a sitting position.

[0005] The present invention is a pole-like device that derives its vertical stability from both a base system as well as a bed frame, wall or like support attachment. This stability facilitates supplying manual assistance for a patient getting into or out of a bed, chair, or the like. The device enables the user to achieve stable equilibrium for independent movement and functions to broaden the support base of the patient so as to provide a substitute for the use of an elbow or bent leg to assist in the rising motion.

[0006] The device has both an ergonomically designed handrail in the form of a convoluted tube and an elevated, curved handle that is attached to a pole-like projection mounted to a base system. The convoluted handrail provides optimal leverage to the user during rising movement and the curved handle enables the user to steady themselves as they rise from a bed, chair, or the like. The device may also be mounted to the wall, or other support surface, to assist at any desired location, such as adjacent a chair. The wall mounting system uses a series of adjustable brackets having holes that allow one to secure the pole to a wall or similar structure.

[0007] A further object of the invention is to provide a support which has spaced, convoluted hand grips and an angled handle to provide optimum leverage for the user to utilize back, shoulder, and arm muscle groups in self-assisted movement while getting into or out of a supine or seated position.

[0008] An additional object of the invention is to provide a relatively inexpensive, user-friendly support device which enables the user to be independent of the help of others for getting into and out of a supine or seated position.

Summary of the Invention

[0009] A rise support device is provided which comprises a handrail in the form of a convoluted tube attached to a vertical pole stabilized by a bed frame and base frame. Alternatively, the device may be wall mounted, being stabilized by a system of mounted wall brackets. The device further includes a curved, horizontal leveraging handle portion, which extends from the pole-like support structure. The device allows the user the ability to build momentum by pushing off the upper hand grip and allows the user to

control momentum by regaining balance as well as readjusting posture by gripping the lower handrail member. This function is necessary for the safe completion of rising from a bed or getting out of a chair. Also the user can push off the curved grip with one hand while simultaneously reaching for the convolution shaped handrail during the rising movement which enables the user to steady them as they climb out of bed.

[0010] The invention generally comprises a pole-like support member having a base handrail member that may be convoluted in form. This base handrail member is supported by a rod which generally projects into and parallel with the patient support surface. Because the base handrail member is desirably formed by a series of convolutions, it creates a plurality of vertical and horizontal grabbing surfaces. The device can be used for coming to a sitting position from a supine position, or from a seated position to a standing position. The support may also include an elevated handle, which can be gripped for pulling or pushing motion from a half-rise when rising from a chair. This handle can also be used to enable the user to pivot to a side-facing position in approaching the edge of the bed. The base may be secured by an L-shaped bracket, which is positioned under one side of a bed frame or the like, and by a floor-contacting H-frame base. Alternatively, when the pole support is used as an assistive device for a chair, the device is secured by both an adjustable floor base and a system of mounted wall brackets.

Brief Description of the Drawings

[0011] FIG. 1 is a perspective view of a rise assist apparatus in accordance with this invention;

FIG. 2 is an elevational view of the pole support attachment and base attachment means;

FIG. 3 is a top plan view of the H-frame base attachment and pole support attachment means;

FIG. 4 is an elevational view of the H-frame base means, which is a part of the present invention;

FIG. 5 is an elevational view of the first hand-assist means;

FIG. 6 is a top plan view of a second hand-assist means, which is a part of the present invention;

FIG. 7 is an elevational view of the bed attachment means;

FIG. 8 is a perspective view of a second embodiment of the support pole, with wall attachment means.

Detailed Description of the Drawings

[0012] FIG. 1 generally illustrates a rise support **10** in accordance with an embodiment of the invention, comprising a vertical support pole member **12**. The pole member **12** may itself be comprised of two independent pole members: upper member **52** and lower member **50**, if desired, allowing the device to be broken down for storage. This support pole member **12** is attached to a floor-contacting base **14**, comprised in this embodiment by a series of interfitting tubular sections. Specifically, support pole member **12** inserts into an end collar **56** of the base attachment member **53**, illustrated in FIG 2. FIG. 2 depicts the base attachment member **53**, which has a tubular extension **57** that slides inside of an opposing tubular "T" member **55** shown in FIGS. 1, 3, and 4. This system of opposing, slideably adjustable members allows the user to increase or decrease the distance the support pole **12** is positioned in relation to the base **14**. To fasten the members **53** and **55** together, the user may insert any suitable attachment means, such as a compression screw or removable pin in a provided hole system incorporated in the opposing members **53** and **55**. In the embodiment shown, the floor contacting base or frame **14** is shaped into a stable H configuration but other suitable base frame configurations are possible.

[0013] Turning to FIG. 4, the "T" housing section **66** of "T" member **55** allows a smaller diameter "T" end tube **64** which is perpendicular to "T" member **55** to be slideably situated and adjusted in the housing section **66**. This "T" end tube **64** is fastened to the housing section **66** by inserting any suitable attachment means, such as a compression screw or removable pin in the provided hole system incorporated into the housing section **66** and "T" end tube **64**. Once "T" tube end **64** is inserted in and through tubular housing section **66**, a similar opposing "T" end tube **62** is situated to slide inside of the tubular section provided by opposing "T" end tube **64**. The opposing

"T" tube ends **62** and **64** are fastened together by inserting any suitable attachment means, such as a compression screw or removable pin in the provided hole system incorporated in both "T" tube ends **62** and **64**. Inserted through each opposing "T" end housing **68,70** of the H-base **14** resides parallel strut members **72,74** that are situated to provide vertical stability as well as a lower center of gravity for the support pole **12**. These strut members **72** and **74** are slideably adjustable within their respective "T" end housings **68,70**. Once positioned, the parallel strut members **72,74** are fastened to their corresponding "T" end housings **68,70** by inserting any suitable attachment means, such as a compression screw or removable pin in the provided hole system incorporated in both the "T" end housings **68,70** and the parallel strut members **72,74**.

[0014] Returning to FIG. 1, rise support **10** includes a base handrail member **20** having a support rod **18** held by a collar **28** in an adjustable, locked position relative to the pole **12**. In order to hold the base handrail member **20** in position relative to the pole and ultimately to a bed, a suitable attachment means, such as compression screw or removable pin, is inserted in the hole system integrated into the tubes. FIG. 5 illustrates the shape of the base handrail member **20**, which takes the form of a pair of interconnected and spaced convolutions. Specifically, these tubular convolutions create a plurality of alternating grasping surfaces that include: substantially horizontal sections **80**, **82**, **84**, **86**, **88**, curved sections **98**, **102**, **106,110**, substantially vertical **90**, **92**, **94**, **96**, and curved sections **100**, **104**, **108**, **112**. The base member **20** is typically much smaller than traditional frame-mounted bed rails. Further, base handrail member **20** serves as an aid for assisting a person into and out of bed, not a restraint device. Conventional bed rails may in fact impede mobility in transferring in and out of bed. The handrail member's support rod **18** is offset and is attached to the rear, center of vertical section **94**. Support rod **18** is adjustable for various distances from the edge of the bed mattress inwards towards the person in the bed or outwards which permits personalized positioning. Support rod **18** also assists persons by providing a horizontal surface/grasp that allows the person to push himself or herself upward from a seated to a standing position or support for steadying a person from and standing to seated position getting into the bed. The handrail member **20** is typically elongated, having a greater length than height, allowing progressive grasping of sections as the user moves to a seated

position from a supine position. Alternatively, a different configuration may be suitable for facilitating other desired motions, such as progressively higher grasping portions relative to the user. The tube by which the convolution pattern is created is typically of a diameter to be easily grasped. The distance between the handgrip surfaces of handrail member **20** may be uniform or may vary between sections. The desired distance will allow relatively easy movement between sections, but still requires the patient to use their strength and flexibility. Furthermore, the distance between upper and lower grasping members may similarly be uniform or may vary as desired. The dimensions are preferably designed to allow a person to utilize the base member in a hand-over-hand fashion to assist them in rising and can be distinguished from the configuration of bed rails and the like which are designed to restrain persons and keep them in bed. These grasping surfaces also provide an enhanced grasping area so that a user can use unstructured grabbing patterns and be assured that they will be able to have a surface to grab a hold of.

[0015] The rise support **10** may also comprise an elevated curved handle member **34** having a positionable support rod **16** which terminates in a collar **15** having an attachment mechanism, such as a screw or a pin, which selectively attaches the curved handle member **34** relative to the vertical pole **12** in a manner similar to the base handrail member **20**. The curved handle member **34** may be positioned to be elevated relative to the base handrail member **20**, i.e., it is vertically spaced above the base on the pole relative to the floor.

[0016] The curved handle member **34** shown in FIGS. 1 and 6 extends from the support rod **16** and enables the user to reach, using either hand, from the base hand rail member **20** to the curved handle **116** so that the user is provided with assistance to arise from a half-rise position. The curved handle member **34** is generally oval shaped, and may also be formed from a hollow or solid steel bar, or other suitable materials, having an outer diameter of from about 0.5 to about 2.0 inches, preferably from about 1 to about 1.5 inches, and a cross-sectional thickness which is about 1/8 diameter thickness of the pole, i.e., from about 1/8 inch to about 1/16 inch. The handle member **34** as well as handrail member **20** are generally designed to withstand dynamic loading up to the expected loads to be applied, with a safety factor of 3 for a total loading

capacity of at least 750 pounds, but any suitable loading capacity is contemplated. The curved handle **116** may have a flat side **120** extending in a perpendicular fashion to the support rod **16** and having a curving, semi-oval portion **118** which is grasped by the user in rising. The curved handle **116** generally has a length along the flat portion **120** of from about 4 inches to about 12 inches, preferably from about 5 inches to about 9 inches, an internal radius on a curved portion from about 3 inches to about 7 inches, preferably from about 4.5 inches to about 5 inches, and an outer diameter of from about 0.5 inch to about 2.0 inches, preferably from about 1inch to about 1.5 inches. The handle also includes an area such that the curved oval handle **116** projects a distance from the support rod **16** which optimizes the leverage the user can apply to the curved oval portion **118** of the handle relative to the rod, and is from about 4 inches to about 12 inches, and preferably from about 5 inches to about 9 inches. The relative height of the base handrail member **20** to the bed can be adjusted using the corresponding collar means **28**, and similarly the relative height of the curved handle member **34** relative to the base member as well as the angle between the support rods **18** and **16** can be adjusted by the positioning of the rods in order to optimize the movement of the user, or to accommodate a particular location or environment. The collars **28**,**14** for respective curved handle member **34** and lower handrail member **20** may be from about 1 inch to about 4 inches in depth, and preferably from about 2 inches to about 3 inches.

[0017] The invention also includes a bed frame attachment member **24**, shown in detail in FIG. 7 for supporting the vertical pole **12** relative to a stable object, such as a bed. This bed frame attachment member **24** is comprised of a collar **22**, connecting rod **26**, and a L- bracket **126** that is formed by vertical section **128** and horizontal section **130** which meet at a 90 degree angle and serves the function of extending under the frame of a bed or box springs. Additionally, this bed frame attachment member **24** is capable of infinite vertical adjustment with respect to the vertical pole **12**, thereby allowing the L-bracket **126** to be aligned with a bed, bed's frame or other suitable attachment location of the bed. In order to fix the bed frame attachment member in position, the user can insert a pin, compression screw, or other suitable fastener through the slot **124** of the collar **22** and through one of the plurality of through holes located on the vertical pole **12**. Additionally, the slot **124** allows for a further "fine"

adjustment of the L-bracket's height, whereby the user tightens a compression screw or other fastener capable of exerting a compressive force against the slot **124** of the collar **22** to fix the L-bracket in position. Other fixation systems for the bed frame attachment member **24** are also contemplated, wherein the collar **22** utilizes a fastener such as a compression screw, spring-loaded pin or other fastener capable of exerting a compressive force against the outer wall of the vertical pole **12** are used to hold the bed attachment member **24** in the desired position. It is also contemplated that the bed frame attachment member **24** is horizontally adjustable, thereby allowing the connecting rod **26** to extend or retract so that it can engage a bed or bed's frame, or other suitable attachment location at a desired distance.

[0018] The rise support **10** may also include a plurality of vertically adjustable stabilizing feet **63** that are capable of stabilizing and leveling the H-frame base of the rise support 10 with respect to a floor surface. These stabilizing feet **63** may be placed on the bottom surface of the floor contacting members which include: "T" member **55**; "T" end tubes **62, 64**; strut members **72, 74,** or any other suitable surface of the present invention 10.

[0019] The support pole device **10** has tremendous versatility by virtue of its ability to be easily adapted for use with not only a bed but also a chair or similar seating apparatus. This support pole device **10**, when configured for use with a chair assists the user in descending into a seated position and provides the user with a source of stability when rising from such a position. The embodiment of the support device as configured for use with a chair is shown in FIG. 8. The support pole **12** is comprised of upper member **52** and lower member **50** which are fastened together by a compression screw or pin that is inserted into the appropriate hole contained in support pole **12**. Support pole **12** is inserted into collar **200**, which has a tubular extension not shown in FIG. 8 that slides inside of the end of chair support base **202** and is fastened to the base by a pin, compression screw or other suitable means. Located above the chair support base **200** are two L-shaped assemblies **207**,**211** that allow the support pole **12** to be mounted to a wall or other similar structure. The lower L-shaped assembly **207** is comprised of a collar **204**, support rod **205**, and support elbow **206**. Support elbow **206** slides inside support rod **205** and is fastened to support rod **205** by a pin, compression

screw or other suitable means. Situated above the lower L-shaped assembly **207** is an identical L-shaped structure **211** that is also comprised of a collar **208**, support rod **209**, and support elbow **210**. As in the lower L-shaped assembly, support elbow **210** slides inside support rod **209** and is fastened to support rod **209** by a pin, compression screw or other suitable means. In order to connect the support pole **12** to the wall or other support surface, connection brackets **212** and **214** are used. These brackets **212** and **214** may be comprised of mounting plates **215,219** and attached tubular sections **213,217**. Mounting plates **215** and **219** may contain holes, which allow the mounting plates **215,219** to be attached to a wall or similar structure. In addition, both supports **210,206** and connection brackets **212,214** may contain holes so that connection brackets **212** and **214** can be slideably adjusted and fastened by a suitable means such as a pin or compression screw to respective support elbows **210** and **206**. Attached above both L-shaped attachment structures **211,207** may be positioned a support member, shown in this embodiment as curved handle member **34** attached to support pole member **12** via collar **15**. Furthermore, the user of the support pole device **10** is able to slideably adjust in a vertical direction, the curved handle member **34**, and each of the two L-shaped attachment assemblies **207,211** on the support pole **12**. The ability to adjust the height of specific members is achieved by a system of holes or the like, which are integrated into the support pole **12** which will accept a pin, compression screw or any other suitable means of attachment. It is also contemplated that vertically adjustable stabilizing feet may be attached to the bottom of chair support base **202**, thereby allowing the user to level and stabilize the rise support **10** with respect to a floor surface.

[0020] The components of the device can be made of any suitable material, which has a sufficient strength to bear expected loads, such as enameled sheet metal, or plastic, including for example metal or plastic, such as heat-formed thermoplastics.